



## Abstract

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**PI Name:** SCHNEIDER, BARBARA A.

**PI Email:** [bsschneider@facstaff.wisc.edu](mailto:bsschneider@facstaff.wisc.edu)

**PI Title:**

**Project Title:** Ovarian Hormone Effects of Muscle Injury and Recovery

**Abstract:** *DESCRIPTION (provided by applicant): In the United States, there are about 57.6 million athletic and physically active women. More women are participating in high-intensity sports activities than ever before. Consequently, women as well as men are at risk for eccentric contraction-induced injury. Eccentric contraction-induced injury occurs when the extrinsic load on a stretched muscle exceeds the amount of force produced by that muscle. However, there are no criteria that enable health care providers to effectively predict which group(s) of women (e.g., premenopausal women and/or women taking oral contraceptives or hormone replacement therapy) have an increased susceptibility to develop eccentric contraction-induced injury. The long-term objective of our research program is to understand how personal factors, such as gender, influence eccentric contraction-induced injury and recovery. Limited study suggests that female gender may be one personal factor. The specific aims of the proposal are to determine the independent and interactional effects of estradiol and progesterone on 1) susceptibility to develop eccentric contraction-induced injury and 2) host defense (inflammatory) response to eccentric contraction-induced injury. The hypotheses are 1) estradiol alone increases injury susceptibility; 2) progesterone attenuates the estradiol increased injury susceptibility; and 3) a combination of estradiol and progesterone delays recovery by inhibiting and delaying the host defense response to eccentric contraction-induced injury. The hypotheses will be tested using intact mice (mice that have ovaries) and ovariectomized mice (mice that have had their ovaries surgically removed). The ovariectomized mice will be treated with placebo, estradiol alone, progesterone alone, or a combination of estradiol and progesterone. Slow-twitch and fast-twitch muscles of both intact and ovariectomized mice will undergo eccentric contraction-induced injury. Then*

*functional and structural changes and magnitude of macrophage infiltration will be measured in injured muscles. Findings may have implications for women of varying ovarian hormone status when they engage in high-intensity eccentric contractions.*

**Thesaurus Terms:**

*estradiol, hormone regulation /control mechanism, muscle disorder, musculoskeletal disorder therapy, progesterone, rehabilitation  
cellular immunity, disease /disorder proneness /risk, inflammation, macrophage, muscle function, striated muscle  
laboratory mouse, ovariectomy*

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500 LINCOLN DR  
MADISON, WI 53706

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